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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,438	10/22/2003	Yoshihiro Shiode	1232-5183	8418
27123	7590	12/16/2005	EXAMINER	
MORGAN & FINNEGAN, L.L.P. 3 WORLD FINANCIAL CENTER NEW YORK, NY 10281-2101			AKANBI, ISIAKA O	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 12/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/692,438

Applicant(s)

SHIODE, YOSHIHIRO

Examiner

Isiaka O. Akanbi

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>08 June 2004</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Information Disclosure Statement*

The information disclosure statement file 08 June 2004 has been entered and reference considered by the examiner.

### *Drawings*

The examiner approves the drawings filed 22 October 2003.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 9-13, 15 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Shiode et al. (6,633,390). The reference of Shiode discloses the features of the claimed as follows:

As regard to claim 1, Shiode discloses a method of measuring an optical characteristic of an optical system comprising of the following:

a first detecting step for causing each of plural light beams from a pattern (Page 2, Par. 0047, line 9-13) to pass a predetermined position on a pupil plane (10) of the optical system (fig. 1) and subsequently imaging the light beams separately by (3), and for detecting an imaging position of each light beam upon the pupil plane (10) of the optical system (fig. 1) (Page 3, Par. 0049)(Page 3, Par. 0050, line 11-14);

a second detecting step for detecting error information related to a passage position as each light beam passes through the pupil plane (Page 3, Par. 0051, line 1-8); and

a third detecting step for detecting wavefront aberration of the optical system on the basis of the imaging position of each light beam upon the pupil plane and of the error

information related to the passage position of each light beam on the pupil plane (10)(Page 3, Par. 0050, line 9-13).

As regard to claim 2, Shiode discloses a method of measuring an optical characteristic of an optical system comprising of the following:

a first detecting step by for causing each of plural light beams from a pattern to pass through a pupil plane (10) of the optical system and (8) subsequently causing the light beams to interfere with each other and imaging them, and for detecting an imaging position upon the pupil plane of the optical system (fig. 1);

a second detecting step for detecting error information related to a passage position as each light beam passes through the pupil plane (Page 3, Par. 0051, line 1-8); and

a third detecting step for detecting wavefront aberration of the optical system on the basis of the imaging position of each light beam upon the pupil plane and of the error information related to the passage position of each light beam on the pupil plane(10)(Page 3, Par. 0050, line 9-13).

As regard to claims 3, 9 and 15, Shiode discloses an apparatus for measuring an optical characteristic of an optical system comprising of the following:

a projection optical system for projecting a pattern of an original onto a substrate (Page 2, Par. 0046, line 1-11);

position detecting means (13c) for detecting, when each of plural light beams from a pattern passes a predetermined position on a pupil plane (10) of the optical system and the light beams are subsequently imaged separately (Page 2, Par. 0047, line 7-13), an imaging position of each light beam upon the pupil plane of the optical system (fig.1);

storing means for storing error information related to a passage position as each light beam passes through the pupil plane (Page 3, Par. 0052- Par. 53, line 1-9); and  
calculating means for calculating wavefront aberration of the optical system on the basis of a result of detection made by said position detecting means and the error information stored in said storing means (Page 6, Par. 0083, line 1-11) (Page 6, Par. 0091).

As regard to claims 4 and 10, Shiode discloses wherein said position detecting means detects the imaging position of each light beam under different conditions which differ from each other in respect to the state of generation of a predetermined aberration of the optical system,

and wherein said storing means stores error information obtained on the basis of results of detections made under the different conditions (Page 3, Par. 0050, line 9-20).

As regard to claims 5 and 11, Shiode discloses wherein the predetermined aberration is at least one of spherical aberration, coma aberration and astigmatism (Page 1, Par. 0013- Par. 14, line 1-5).

As regard to claims 6 and 12, Shiode discloses wherein the different conditions are established by performing at least one of i) changing a position of photoelectric converting means, for detecting the imaging position, or of a wafer coated with a resist, in an optical axis direction of the optical system, ii) changing a wavelength of light for imaging the pattern, and iii) moving an optical element of the optical system (Page 3, Par. 0050, line 9-11).

As regard to claims 7 and 13, Shiode discloses wherein the pattern comprises a substrate (9) having a mark group formed in a region which can be regarded as one image height, and a light blocking plate (4) having a pinhole formed at a position corresponding to a center of the region of the substrate, and wherein said light blocking plate is disposed between the substrate and the optical system (fig. 1).

As to claims 8 and 14, the reference of Shiode discloses a substrate (9) having a mark group formed in a region which can be regarded as one image height, and a light blocking plate (4) having a pinhole formed at a position corresponding to a center of the region of the substrate, wherein said light blocking plate is disposed at a light entrance side of the substrate (fig. 1), further the reference of Shiode in another embodiment (fig. 18A) discloses wherein each of marks constituting the mark group is provided by a grid pattern arranged to provide substantially only zero-th order light to pass through the pupil plane (10).

As regard to claim 16, Shiode discloses a device manufacturing method, comprising the steps of:

exposing a wafer with a device pattern of an original through a projection optical system; and developing the exposed wafer (Page 2, Par. 0046, line 1-11);

wherein wavefront of the projection optical system is measured by use of an optical characteristic measuring apparatus which comprises; i) position detecting means (13c) for detecting, when each of plural light beams from a pattern passes a predetermined position on a pupil plane (10) of the optical system and the light beams are subsequently imaged separately (Page 2, Par. 0047, line 7-13), an imaging position of each light beam upon the pupil plane of the optical system (fig. 1), ii) storing means for storing error information related to a passage

position as each light beam passes through the pupil plane (Page 3, Par. 0052-Par. 53, line 1-9), and iii) calculating means for calculating wavefront aberration of the optical system on the basis of a result of detection made by said position detecting means and the error information stored in said storing means (Page 6, Par. 0083, line 1-11) (Page 6, Par. 0091).

### **Additional Prior Art**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references listed in the attached form PTO-892 teach of other prior art projection exposure apparatus, and device manufacturing method that may anticipate or obviate the claims of the applicant's invention.

### **Conclusion**

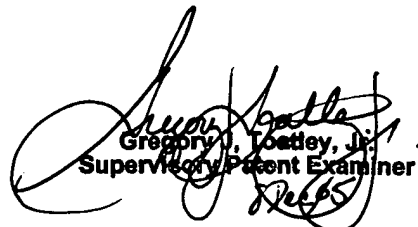
### **Fax/Telephone Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Isiaka Akanbi whose telephone number is (571) 272-8658. The examiner can normally be reached on 8:00 a.m. - 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Isiaka Akanbi  
December 1, 2005

  
Gregory J. Toatley, Jr.  
Supervisory Patent Examiner